Access DB# 79181

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Andrew Wessman Examiner #: 78959 Date: 10/31/02
Art Unit: 1742 Phone Number 305-3163 Serial Number: 09/966 861
Mail Box and Bldg/Room Location: CP3 7D12 Results Format Preferred (circle): PAPER DISK E-MAIL

If mor than one search is submitted, please prioritize searches in order of need.

****

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: High Purity Cobalt method of manufacturing thereof and high purity cobalt targets

Inventors (please provide full names): See Sheet

Earliest Priority Filing Date: 9/27/00

***For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.**

Please ignore claims 1, 2, 12, 13

Search process of claims 3-11

also search similar processes involving nickel

****

STAFF USE ONLY		**Type of Search**		**Vendors and cost where applicable**	
Searcher:	Koroma, A	NA Sequence (#)		STN	✓
Searcher Phone #:	308 3142	AA Sequence (#)		Dialog	
Searcher Location:	EIC1700	Structure (#)		Questel/Orbit	
Date Searcher Picked Up:		Bibliographic	✓	Dr.Link	
Date Completed:	11/05/02	Litigation		Lexis/Nexis	
Searcher Prep & Review Time:		Fulltext		Sequence Systems	
Clerical Prep Time:		Patent Family		WWW/Internet	
Online Time:		Other		Other (specify)	

PTO-1590 (8-01)

WES0966861

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=> d his

     (FILE 'HOME' ENTERED AT 09:55:59 ON 05 NOV 2002)

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     FILE 'HCAPLUS' ENTERED AT 11:02:06 ON 05 NOV 2002
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L3  (          2)SEA FILE=REGISTRY ABB=ON  PLU=ON  7440-50-8 OR 17493-86-6
L4  (     846381)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L2 OR COBALT OR CO OR COBALT I
L5  (      35595)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L4(L)(PUR OR PREP OR IMF OR SP
L6  (      28453)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L1 OR COBALT CHLORIDE OR COCL2
L7  (       1800)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L5 AND L6
L8  (          1)SEA FILE=REGISTRY ABB=ON  PLU=ON  HYDROCHLORIC ACID/CN
L9  (        173)SEA FILE=HCAPLUS ABB=ON  L7 AND (HYDROCHLORIC ACID OR HCL OR L8
L10 (    1023757)SEA FILE=HCAPLUS ABB=ON  L3 OR COPPER OR CU
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L12 (         11)SEA FILE=HCAPLUS ABB=ON  L11 AND METAL?/SC,SX
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L14 (          5)SEA FILE=HCAPLUS ABB=ON  L13 AND ION EXCHANGE
L15 (          6)SEA FILE=HCAPLUS ABB=ON  L13 AND (ION EXCHANGE OR HIGH TEMPERAT
L16 (         16)SEA FILE=HCAPLUS ABB=ON  L12 OR L14 OR L15
L17 (          1)SEA FILE=REGISTRY ABB=ON  PLU=ON  NICKEL/CN
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L19 (      47426)SEA FILE=HCAPLUS ABB=ON  PLU=ON  (L17 OR NI OR NICKEL)(L)(PREP
L20 (      17023)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L18 OR NICKEL CHLORIDE OR NICL
L21 (       2185)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L19 AND L20
L22 (          1)SEA FILE=REGISTRY ABB=ON  PLU=ON  HYDROCHLORIC ACID/CN
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L26 (         29)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L24 AND (L25 OR COPPER OR CU)
L27 (         25)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L26 NOT ELECTRODEP?
L28 (          6)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L27 AND (ION EXCHANG? OR HIGH
L29           21 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L16 OR L28
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     FILE 'WPIX' ENTERED AT 11:14:32 ON 05 NOV 2002
L30        11960 S (COBALT OR CO)(5A)(PURIF? OR MANUFAC? OR MAKE? OR MAKING OR P
                 SET PLURAL OFF PERM
L31         2529 S COBALT CHLORIDE OR COCL2
L32          168 S L30 AND L31
L33         8336 S (NICKEL OR NI)(5A)(PURIF? OR MANUFAC? OR MAKE? OR MAKING OR P
L34         1760 S NICKEL CHLORIDE OR NICL2
L35          224 S L33 AND L34
L36          382 S L35 OR L32
L37      1281538 S ION EXCHANG? OR RESIN?(2A)EXCHANGE OR HYDROCHLORIC ACID OR HC
L38          126 S L37 AND L36
L39          115 S L38 NOT ELECTROP?
                 E JP2000-338288/PRN,AP
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WES0966861

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L40           1 S E3
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L42           0 S L38 AND C22B03/IC
L43           0 S L38 AND C22B003/IC
L44          14 S L41 OR L43

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L45           1 S L44

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L46          26 S L39
L47        3236 S 46
L48          26 S L46
L49           7 S L46 AND 43/CC

=> set cost off
SET COMMAND COMPLETED

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USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
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FILE COVERS 1907 - 5 Nov 2002  VOL 137 ISS 19
FILE LAST UPDATED: 3 Nov 2002  (20021103/ED)
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This file contains CAS Registry Numbers for easy and accurate substance identification.

CAS roles have been modified effective December 16, 2001. Please check your SDI profiles to see if they need to be revised. For information on CAS roles, enter HELP ROLES at an arrow prompt or use the CAS Roles thesaurus (/RL field) in this file.

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L3  (          2)SEA FILE=REGISTRY ABB=ON  PLU=ON  7440-50-8 OR 17493-86-6
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L7  (       1800)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L5 AND L6
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L9  (        173)SEA FILE=HCAPLUS ABB=ON  L7 AND (HYDROCHLORIC ACID OR HCL OR
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L10 (    1023757)SEA FILE=HCAPLUS ABB=ON  L3 OR COPPER OR CU
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L12 (         11)SEA FILE=HCAPLUS ABB=ON  L11 AND METAL?/SC,SX
L13 (         40)SEA FILE=HCAPLUS ABB=ON  L9 AND (PURIFYING OR SEPARATING OR
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L14 (          5)SEA FILE=HCAPLUS ABB=ON  L13 AND ION EXCHANGE
L15 (          6)SEA FILE=HCAPLUS ABB=ON  L13 AND (ION EXCHANGE OR HIGH
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L27 (         25)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L26 NOT ELECTRODEP?
L28 (          6)SEA FILE=HCAPLUS ABB=ON  PLU=ON  L27 AND (ION EXCHANG? OR HIGH
                TEMP? OR HEAT)
L29           21 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L16 OR L28


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FILE LAST UPDATED:           31 OCT 2002      <20021031/UP>
MOST RECENT DERWENT UPDATE:     200270         <200270/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

>>> SDI run number 70 for WPI was inadvertently processed with
    a wrong ED/UP date resulting in empty answer sets.
    Therefore SDI 70 will be rerun tonight.  <<<

>>> SLART (Simultaneous Left and Right Truncation) is now
    available in the /ABEX field. An additional search field
    /BIX is also provided which comprises both /BI and /ABEX <<<

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WES0966861

http://www.derwent.com/userguides/dwpi_guide.html <<<

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L31          2529 SEA FILE=WPIX ABB=ON  COBALT CHLORIDE OR COCL2
L32           168 SEA FILE=WPIX ABB=ON  L30 AND L31
L33          8336 SEA FILE=WPIX ABB=ON  (NICKEL OR NI)(5A)(PURIF? OR MANUFAC? OR
                  MAKE? OR MAKING OR PREP? OR FABRIC?)
L34          1760 SEA FILE=WPIX ABB=ON  NICKEL CHLORIDE OR NICL2
L35           224 SEA FILE=WPIX ABB=ON  L33 AND L34
L36           382 SEA FILE=WPIX ABB=ON  L35 OR L32
L37       1281538 SEA FILE=WPIX ABB=ON  ION EXCHANG? OR RESIN?(2A)EXCHANGE OR
                  HYDROCHLORIC ACID OR HCL OR HEAT OR HIGH TEMP? OR COPPER OR CU
L38           126 SEA FILE=WPIX ABB=ON  L37 AND L36
L41            14 SEA FILE=WPIX ABB=ON  L38 AND C22B023/IC
L43             0 SEA FILE=WPIX ABB=ON  L38 AND C22B003/IC
L44            14 SEA FILE=WPIX ABB=ON  L41 OR L43


=> file japio
FILE 'JAPIO' ENTERED AT 11:53:13 ON 05 NOV 2002
COPYRIGHT (C) 2002 Japanese Patent Office (JPO)- JAPIO

FILE LAST UPDATED: 29 OCT 2002       <20021029/UP>
FILE COVERS APR 1973 TO JUNE 28, 2002

>>> JAPIO has been reloaded on August 25 and saved answer sets
    will no longer be valid.  SEE HELP RLO for details  <<<


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L31          2529 SEA FILE=WPIX ABB=ON  COBALT CHLORIDE OR COCL2
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L33          8336 SEA FILE=WPIX ABB=ON  (NICKEL OR NI)(5A)(PURIF? OR MANUFAC? OR
                  MAKE? OR MAKING OR PREP? OR FABRIC?)
L34          1760 SEA FILE=WPIX ABB=ON  NICKEL CHLORIDE OR NICL2
L35           224 SEA FILE=WPIX ABB=ON  L33 AND L34
L36           382 SEA FILE=WPIX ABB=ON  L35 OR L32
L37       1281538 SEA FILE=WPIX ABB=ON  ION EXCHANG? OR RESIN?(2A)EXCHANGE OR
                  HYDROCHLORIC ACID OR HCL OR HEAT OR HIGH TEMP? OR COPPER OR CU
L38           126 SEA FILE=WPIX ABB=ON  L37 AND L36
L41            14 SEA FILE=WPIX ABB=ON  L38 AND C22B023/IC
L43             0 SEA FILE=WPIX ABB=ON  L38 AND C22B003/IC
L45             1 SEA FILE=JAPIO ABB=ON  L41 OR L43


=> file metadex
FILE 'METADEX' ENTERED AT 11:53:38 ON 05 NOV 2002
COPYRIGHT (c) 2002 Cambridge Scientific Abstracts (CSA)

FILE LAST UPDATED: 14 OCT 2002       <20021014/UP>
FILE COVERS 1966 TO DATE.

=> d que l49
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                MANUFAC? OR MAKE? OR MAKING OR PREP? OR FABRIC?)
L31        2529 SEA FILE=WPIX ABB=ON  COBALT CHLORIDE OR COCL2
L32         168 SEA FILE=WPIX ABB=ON  L30 AND L31
L33        8336 SEA FILE=WPIX ABB=ON  (NICKEL OR NI)(5A)(PURIF? OR MANUFAC? OR
                MAKE? OR MAKING OR PREP? OR FABRIC?)
L34        1760 SEA FILE=WPIX ABB=ON  NICKEL CHLORIDE OR NICL2
L35         224 SEA FILE=WPIX ABB=ON  L33 AND L34
L36         382 SEA FILE=WPIX ABB=ON  L35 OR L32
L37     1281538 SEA FILE=WPIX ABB=ON  ION EXCHANG? OR RESIN?(2A)EXCHANGE OR
                HYDROCHLORIC ACID OR HCL OR HEAT OR HIGH TEMP? OR COPPER OR CU
L38         126 SEA FILE=WPIX ABB=ON  L37 AND L36
L46          26 SEA FILE=METADEX ABB=ON  L38 NOT ELECTROP?
L49           7 SEA FILE=METADEX ABB=ON  L46 AND 43/CC
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=> dup rem l29 l44 l45 l49
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USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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FILE 'WPIX' ENTERED AT 11:54:36 ON 05 NOV 2002
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FILE 'JAPIO' ENTERED AT 11:54:36 ON 05 NOV 2002
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FILE 'METADEX' ENTERED AT 11:54:36 ON 05 NOV 2002
COPYRIGHT (c) 2002 Cambridge Scientific Abstracts (CSA)
PROCESSING COMPLETED FOR L29
PROCESSING COMPLETED FOR L44
PROCESSING COMPLETED FOR L45
PROCESSING COMPLETED FOR L49
L50          42 DUP REM L29 L44 L45 L49 (1 DUPLICATE REMOVED)
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applicant

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=> d l50 1-42 all

L50  ANSWER 1 OF 42  HCAPLUS  COPYRIGHT 2002 ACS
AN   2002:270754  HCAPLUS
DN   136:302890
TI   High-purity cobalt, manufacturing, and high-purity cobalt targets
IN   Uchikoshi, Masahito; Yokoyama, Norio; Kekesi, Tamas; Isshiki, Minoru
PA   Sony Corp., Japan
SO   Jpn. Kokai Tokkyo Koho, 10 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C23C014-34
     ICS  C22B003-42; C22B023-00; C22C019-07
CC   76-12 (Electric Phenomena)
     Section cross-reference(s): 56
FAN.CNT 1
     PATENT NO.        KIND  DATE           APPLICATION NO.  DATE
     ---------------   ----  ---------      ---------------  --------
PI   JP 2002105633      A2   20020410       JP 2000-338288   20000929
     US 2002117025      A1   20020829       US 2001-966861   20010928
PRAI JP 2000-338288     A    20000929
AB   The title high-purity Co is manufg. by (1) dissolving Cu-contg.
```

course Co into an aq. **HCl** soln. to give an aq. 0.1-3 kmol/m3 Co chloride soln., (2) mixing the Co chloride soln. with Co under inert gas feeding to make impurity **Cu** into monovalent **Cu**+ in the soln., (3) passing the soln. through an cation exchanger to adsorb the **Cu**+ to be removed, (4) evapg. to dry the aq. soln., and (5) heating at 623-873 K in H2 atm. to give Co.

ST cobalt purifn **copper** impurity removal cation exchange target manuf

IT Electric circuits
(cobalt, formation from sputtering target; high-purity cobalt and manufg. and high-purity cobalt targets)

IT Sputtering targets
(cobalt, purifn. of; high-purity cobalt and manufg. and high-purity cobalt targets)

IT Cation exchangers
(high-purity cobalt and manufg. and high-purity cobalt targets)

IT Purification
(of cobalt, by cation exchanging; high-purity cobalt and manufg. and high-purity cobalt targets)

IT **7646-79-9P, Cobalt chloride,** preparation
RL: PNU (Preparation, unclassified); RCT (Reactant); **PREP (Preparation)**; RACT (Reactant or reagent)
(high-purity **cobalt** and manufg. and high-purity **cobalt** targets)

IT **7440-48-4P, Cobalt,** preparation
RL: **PUR (Purification or recovery); PREP (Preparation)**
(purifn. by ion exchanging; high-purity **cobalt** and manufg. and high-purity **cobalt** targets)

IT **7440-50-8, Copper,** processes **17493-86-6, Copper**(1+), processes
RL: REM (Removal or disposal); PROC (Process)
(removal, by cation exchanging; high-purity cobalt and manufg. and high-purity cobalt targets)

L50 ANSWER 2 OF 42 HCAPLUS COPYRIGHT 2002 ACS DUPLICATE 1
AN 2001:17959 HCAPLUS
DN 134:59386
TI Method for manufacture of high-purity cobalt
IN Nagao, Junko; Sekine, Susumu; Tanaka, Minoru; Yokoyama, Hidechika
PA Kojundo Kagaku Kenkyusho K. K., Japan
SO Jpn. Tokkyo Koho, 4 pp.
CODEN: JTXXFF
DT Patent
LA Japanese
IC ICM C22B023-00
ICS C01G051-08; C25C001-08
CC 54-3 (Extractive Metallurgy)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 3122948	B1	20010109	JP 1999-224389	19990702
	JP 2001020021	A2	20010123		

AB The method comprises: (1) removal of Fe, Zn, Sn, etc. from a **CoCl2** soln. contg. 2-6M **HCl** by anionic **ion exchange** , (2) removal of Ni2+, Ca2+, Na+, Mg2+, etc. from the soln. by solvent **extn**. with an amino org. solvent and stripping, and (3) redn. to obtain Co by drying the soln. to dryness and reducing in flowing H or by electrolysis. The amino org. solvent is trialkylamine, dialkylamine, or

monoalkylamine.
ST cobalt purifn **ion exchange** solvent **extn**
IT **Ion exchange**
Reduction
Solvent **extraction**
(manuf. of high-purity cobalt by **ion exchange**, solvent **extn.**, and redn. with hydrogen or by electrolysis)
IT 106-20-7, Di-2-ethylhexylamine
RL: TEM (Technical or engineered material use); USES (Uses)
(extg. agent; manuf. of high-purity cobalt by **ion exchange**, solvent **extn.**, and redn. with hydrogen or by electrolysis)
IT 54693-66-2, SA 10
RL: TEM (Technical or engineered material use); USES (Uses)
(ion-exchanger; manuf. of high-purity cobalt by **ion exchange**, solvent **extn.**, and redn. with hydrogen or by electrolysis)
IT **7440-48-4P, Cobalt,** preparation
RL: **PUR (Purification or recovery); PREP (Preparation)**
(manuf. of high-purity **cobalt** by **ion exchange**, solvent **extn.**, and redn. with hydrogen or by electrolysis)

L50 ANSWER 3 OF 42 METADEX COPYRIGHT 2002 CSA
AN 2001(12):43-595 METADEX
TI Anion-exchange separation in hydrochloric acid solutions for the ultrahigh purification of cobalt.
AU Kekesi, T. (University of Miskolc); Uchikoshi, M. (Fine Materials (Japan)); Mimura, K. (Tohoku University); Isshiki, M. (Tohoku University)
SO Metallurgical and Materials Transactions B (Aug. 2001) 32B, (4), 573-582, Numerical Data, Spectra, Graphs, 20 ref.
ISSN: 1073-5615
DT Journal
CY United States
LA English
AB Recent applications in advanced electronics have increased the practical importance of ultrahigh-purity cobalt. Anion exchange in HCl media is considered an efficient alternative to the combination of the conventional purification methods. Anion-exchange distribution functions have been determined for cobalt and the main impurity elements by the technique of batch equilibration. Spectrophotometric and elution studies confirmed the established anion-exchange behavior patterns. Based on the new and the available distribution functions, combined with the assessment of thermodynamic stability, a procedure of anion-exchange separation has been devised to eliminate virtually all the impurities from the cobalt-chloride solution. The major shortcoming of previously proposed anion-exchange procedures-failing to separate copper sufficiently-has been corrected by the introduction of a preliminary step under reduced conditions, removing copper from the solution by sorption in the monovalent state. The rest of the impurities are eliminated in a second anion-exchange step by applying rinsing and elution stages under oxidizing conditions. The optimum parameters of the procedure have been determined according to performance characteristics (purification ratios, yields, and volume efficiencies) derived from the analysis of elution curves obtained with laboratory-scale ion-exchange columns. Special computer programs have been developed to facilitate thermodynamic simulation, analytical correction, and data processing.
CC 43 Refining and Purification

WES0966861

CT Journal Article; Cobalt: Refining; Hydrometallurgy; Separation; Ion exchanging; Process parameters; Computer programs: Development
ET Cl*H; HCl; H cp; cp; Cl cp

L50 ANSWER 4 OF 42 METADEX COPYRIGHT 2002 CSA
AN 2001(10):43-517 METADEX
TI Study on organic phase composition and extractive process for purifying nickel chloride solution with N235.
AU Chen, S. (Central-South University of Technology (China)); Wang, W.-X. (Central-South University of Technology (China)); Li, Q.-H. (Central-South University of Technology (China)); Liu, Z.-H. (Central-South University of Technology (China)); Zhang, D.-M. (Central-South University of Technology (China)); Wang, R.-Z. (General Research Institute of Nonferrous Metals (Beijing))
SO Mining and Metallurgical Engineering (China) (Mar. 2001) 21, (1), 56-58, Graphs, 3 ref.
ISSN: 0253-6099
DT Journal
CY China
LA Chinese
AB In the experiments of purifying the solution of chlorine leaching and removing iron from nickel concentrate with N235, the effects of organic phase composition on purifying efficiency have been studied. From the results obtained, the optimal organic phase composition is found to be 25% N235+ 12% isomerous alcohol + 63% sulfonic kerosene (V/V) and the saturated content of cobalt in organic phase is 8 g/L. And then the serial experiment is carried out. The results show that at the given organic phase composition, the purified solution contains rho (Ni) > 200 g/L, rho (Ni)/ rho (Co) > 50000 and the contents of Cu, Fe, Mn, Zn meet the technical criterion of 1* nickel electrolyte. The cobalt chloride solution contains rho (Co) > 110 g/L, rho (Co)/ rho (Ni) > 5000 and the enrichment of cobalt has been achieved. The technical process is simple, stable and reliable.
CC 43 Refining and Purification
CT Journal Article; Nickel: Extraction; Spent liquors; Purification; Leaching; Chlorides
ET V; Ni; Cu; Fe; Mn; Zn; Co

L50 ANSWER 5 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 2000:38006 HCAPLUS
DN 132:95993
TI Manufacture of high-purity cobalt solutions by removing impurities
IN Imamura, Masaki; Makino, Susumu; Tsuchida, Naoyuki; Takaishi, Kazuyuki; Ozaki, Yoshitomo
PA Sumitomo Metal Mining Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C22B023-00
CC 54-2 (Extractive **Metallurgy**)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000017347	A2	20000118	JP 1998-207252	19980707

AB The high-purity Co soln. is manufd. by following steps; (1) oxidn. of the soln. contg. Fe, Mn, Zn, Ca, and **Cu** as impurities at oxidn.-redn. potential .gtoreq.600 mV (based on Ag/AgCl std. electrode)

and pH .gtoreq.4 and then neutralization for removing pptn. of Fe, Mn, and **Cu**; (2) solvent extn. of Zn, Ca, and small amt. of remaining impurities with alkylphosphoric acid; (3) washing the org. phase contg. impurities and a part of Co with an aq. soln. for recovery of Co; (4) and then reverse extn. of impurities in the org. phase with a mineral acid for regenerating the org. phase. Also claimed manuf. steps contain (1') oxidn. of the Co soln. contg. Fe, Mn, Zn, Ca, and **Cu** as impurities at oxidn.-redn. potential .gtoreq.600 mV and pH .ltoreq.4 , neutralization for removing pptn. of Fe, Mn, and a part of **Cu**, and then keeping at pH .gtoreq.4 for removing pptn. of most **Cu**, (2), (3), and then (4). The method provides efficient removal of impurities.

ST cobalt soln purifn oxidn solvent extn; alkylphosphoric acid solvent extn cobalt soln

IT Oxidation
Solvent extraction
(oxidn. and extn. with alkylphosphoric acid in manuf. of high-purity cobalt solns. by removing impurities)

IT 145686-35-7, Clean Sol G
RL: NUU (Other use, unclassified); USES (Uses)
(extn. solvents; oxidn. and extn. with alkylphosphoric acid in manuf. of high-purity cobalt solns. by removing impurities)

IT 7542-09-8, Cobalt carbonate
RL: NUU (Other use, unclassified); USES (Uses)
(neutralizing agents; oxidn. and extn. with alkylphosphoric acid in manuf. of high-purity cobalt solns. by removing impurities)

IT 7782-50-5, Chlorine, uses 7790-92-3, Hypochlorous acid 10028-15-6, Ozone, uses
RL: NUU (Other use, unclassified); USES (Uses)
(oxidizing agents; oxidn. and extn. with alkylphosphoric acid in manuf. of high-purity cobalt solns. by removing impurities)

IT **7440-48-4P, Cobalt,** preparation **7646-79-9P, Cobalt chloride,** preparation
RL: **IMF (Industrial manufacture); PUR (Purification or recovery); PREP (Preparation)**
(oxidn. and extn. with alkylphosphoric acid in manuf. of high-purity **cobalt** solns. by removing impurities)

IT 298-07-7
RL: NUU (Other use, unclassified); USES (Uses)
(oxidn. and extn. with alkylphosphoric acid in manuf. of high-purity cobalt solns. by removing impurities)

IT 7439-89-6, Iron, processes 7439-96-5, Manganese, processes **7440-50-8, Copper,** processes 7440-66-6, Zinc, processes 7440-70-2, Calcium, processes
RL: REM (Removal or disposal); PROC (Process)
(removal of; oxidn. and extn. with alkylphosphoric acid in manuf. of high-purity cobalt solns. by removing impurities)

IT **7647-01-0, Hydrochloric acid,** uses
RL: NUU (Other use, unclassified); USES (Uses)
(washing and reverse-extn. with; oxidn. and extn. with alkylphosphoric acid in manuf. of high-purity cobalt solns. by removing impurities)

L50 ANSWER 6 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 2001-135682 [14] WPIX
DNC C2001-039647
TI Cobalt concentrate processing involves dissolving initial raw material in **hydrochloric acid,** extraction of iron, treating with salting-out agent, and cobalt extraction.

WES0966861

DC M25
IN DYAKOVA, L V; ILENOK, A A; KLYUSHNIKOV, M I; SKLOKIN, L I
PA (ILEN-I) ILENOK A A; (KLYU-I) KLYUSHNIKOV M I
CYC 1
PI RU 2158777 C1 20001110 (200114)* C22B023-00 <--
ADT RU 2158777 C1 RU 2000-104632 20000228
PRAI RU 2000-104632 20000228
IC ICM **C22B023-00**
AB RU 2158777 C UPAB: 20010312
NOVELTY - Method includes dissolving initial raw material in **hydrochloric acid**, extraction of iron from solution, introduction of salting-out agent into solution **purified** from iron, **cobalt** extraction from obtained solution with salts of tertiary amines or quaternary ammonium bases with subsequent washing and re-extraction of **cobalt** to obtain of **purified cobalt** salt in re-extract and **purified nickel** salt in raffinate.

DETAILED DESCRIPTION - Initial raw material is preliminarily roasted. Salting-out agent is used in form of **NiCl2**. Extraction separation of cobalt and nickel is accomplished in two stages. In the first stage, one part of cobalt is extracted with maintenance of equilibrium concentration of **CoCl2** in raffinate equaling 20-80 g/l, and in the second stage, remaining cobalt is extracted from raffinate of the first stage extraction preliminarily evaporated to concentration of **NiCl2** equaling 400-500 g/l.

USE - Technology of cobalt concentrate processing; applicable in production of compounds of cobalt and associated metals, such as nickel, iron, **copper**.

ADVANTAGE - Higher degree of cobalt recovery; liberation of free chloride in dissolving procedure is prevented; low-cost and ecologically clean process. 8 cl
Dwg.0/0
FS CPI
FA AB
MC CPI: M25-A02; M25-B04; M25-G11

L50 ANSWER 7 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1999:728011 HCAPLUS
DN 131:324559
TI Manufacture of fine powder by hydrolysis or reduction of chlorides
IN Tsugita, Yasuhiro; Ishiyama, Naoki
PA Sumitomo Metal Mining Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C01G030-00
ICS B01J019-00
CC 49-3 (Industrial Inorganic Chemicals)
Section cross-reference(s): **54**
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 11314917	A2	19991116	JP 1998-125649	19980508

AB The title fine powder is manufd. from chloride vapor by reacting with steam or a H gas at **high temp.** for hydrolysis or redn. and then solid-gas sepn. of resulting fine powder from a **HCl** gas for recovery. The process is esp. suitable for manuf. of Sb oxide powder

from Sb chlorides or manuf. of metal powder from metal chlorides.
ST steam hydrolysis metal chloride powder manuf; hydrogen redn metal chloride powder manuf
IT Hydrolysis
Reduction
Steam
(manuf. of fine powder by hydrolysis or redn. of metal chlorides)
IT Chlorides, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(manuf. of fine powder by hydrolysis or redn. of metal chlorides)
IT **7647-01-0P**, Hydrogen chloride, preparation
RL: BYP (Byproduct); PREP (Preparation)
(byproduct; manuf. of fine powder by hydrolysis or redn. of metal chlorides)
IT 1313-99-1P, **Nickel** oxide, preparation 1327-33-9P, Antimony oxide **7440-02-0P, Nickel**, preparation 7440-22-4P, Silver, preparation **7440-50-8P, Copper**, preparation
RL: **IMF (Industrial manufacture); PREP (Preparation)**
(manuf. of fine powder by hydrolysis or redn. of metal chlorides)
IT 1344-67-8, **Copper** chloride **7718-54-9, Nickel chloride**, reactions 7783-90-6, Silver chloride, reactions 174141-46-9, Antimony chloride
RL: RCT (Reactant); RACT (Reactant or reagent)
(manuf. of fine powder by hydrolysis or redn. of metal chlorides)
IT 1333-74-0, Hydrogen, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(reducing agents; manuf. of fine powder by hydrolysis or redn. of metal chlorides)

L50 ANSWER 8 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1999-545129 [46] WPIX
DNN N1999-404330 DNC C1999-159539
TI Fine **nickel** powder **preparation** for internal electrode of laminated ceramic capacitor - involves performing solid phase reduction of **nickel chloride** with alkaline earth metal or alkali metal.
DC L03 M22 P53 V01
PA (SUMM) SUMITOMO METAL MINING CO
CYC 1
PI JP 11236631 A 19990831 (199946)* 7p C22B023-02 <--
ADT JP 11236631 A JP 1998-57448 19980223
PRAI JP 1998-57448 19980223
IC ICM **C22B023-02**
ICS B22F009-20
AB JP 11236631 A UPAB: 19991221
NOVELTY - The solid phase reduction of **NiCl2** with alkaline earth metals like magnesium, barium, calcium and strontium or alkali metals like lithium, sodium and potassium is done to **prepare nickel** powder.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for fine nickel powder composition.

USE - For internal electrode of laminated ceramic capacitor.

ADVANTAGE - The reduction process provides high crystalline nickel powder, which can be sintered at **high temperature**.
Dwg.0/1
FS CPI EPI GMPI
FA AB
MC CPI: L03-B03; M22-H01

WES0966861

L50 ANSWER 9 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1999-267683 [23] WPIX
DNC C1999-079681
TI De-**copper** electrolyzer for high purity **nickel manufacture** - reduces bivalent **copper** ratio by reducing **copper** ion in **nickel chloride** solution, followed by electrolytic winning of **copper**.
DC M25 M28
PA (SUMM) SUMITOMO METAL MINING CO
CYC 1
PI JP 11080986 A 19990326 (199923)* 6p C25C001-12
ADT JP 11080986 A JP 1997-254228 19970903
PRAI JP 1997-254228 19970903
IC ICM C25C001-12
ICS **C22B023-06**
AB JP 11080986 A UPAB: 19990616
NOVELTY - Chlorine leaching of nickel is performed to metal sulfide containing **copper** used as raw material. Electrolytic winning of nickel is performed. The **copper** ion in **nickel chloride** solution with **copper** is reduced, thereby reducing bivalent **copper** ratio. The electrolytic refining of **copper** is performed after that.
USE - Used for removing **copper** from **nickel chloride** solution used in high purity **nickel manufacture.**
ADVANTAGE - Maintains productive efficiency of nickel by performing leaching of nickel. DESCRIPTION OF DRAWING(S) - The figure shows the schematic arrangement of the de-**copper** electrolyzer.
Dwg.1/7
FS CPI
FA AB; GI
MC CPI: M25-B; M25-G19; M28-A

L50 ANSWER 10 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1996-426297 [43] WPIX
DNN N1996-358904 DNC C1996-134370
TI Prodn. of pure cobalt for sputtering targets for electronics use - comprises contacting acidic aq. soln. of **cobalt chloride** contg. impurity elements with anion **exchange resin,** eluting cobalt from resin etc..
DC L03 M13 M25 M28 U11 V05 X25
IN SHINDO, Y; SUZUKI, T
PA (NIHA) JAPAN ENERGY CORP
CYC 3

PI	DE 19609439	A1	19960919	(199643)*	10p	C25C001-08	
	JP 08253888	A	19961001	(199649)	4p	C25C001-08	
	US 5667665	A	19970916	(199743)	7p	C25C001-08	
	JP 09227967	A	19970902	(199745)	7p	C22B023-06	<--
	US 5810983	A	19980922	(199845)		C22C019-07	
	JP 3065242	B2	20000717	(200039)	7p	C22B023-06	<--

ADT DE 19609439 A1 DE 1996-19609439 19960311; JP 08253888 A JP 1995-80831 19950314; US 5667665 A US 1996-615005 19960312; JP 09227967 A JP 1996-60362 19960223; US 5810983 A Div ex US 1996-615005 19960312, US 1997-790033 19970128; JP 3065242 B2 JP 1996-60362 19960223
FDT US 5810983 A Div ex US 5667665; JP 3065242 B2 Previous Publ. JP 09227967
PRAI JP 1996-60362 19960223; JP 1995-80831 19950314
IC ICM **C22B023-06**; C22C019-07; C25C001-08

ICS C23C014-14; C23C014-34; C25C007-04
ICA H01L021-3205
AB DE 19609439 A UPAB: 19961025
Process for producing highly pure Co comprises: (a) contacting an aq. soln. of **cobalt chloride** having a **HCl** acid concn. of 7 - 12 N and contg. at least Fe and / or Ni as impurities with an **ion exchange resin** so that the Co is adsorbed by the resin; (b) eluting the Co using 1 - 6 N **HCl** acid as eluent; (c) evaporating the soln. contg. the eluted Co and drying or concentrating in another way and producing a cleaned aq. soln. of **cobalt chloride** having a pH of 0 - 6; and (d) electrolytically refining using the **cobalt chloride** aq. soln. as electrolyte.
Also claimed are: (i) a process as above contg. a further step before the electrolytic refining of (d') removing organic contaminants from the cleaned **cobalt chloride** aq. soln. using activated charcoal; (ii) a process as above in which the original aq. soln. of **cobalt chloride** contains additional impurities, namely alkali metals like K and Na, and radioactive metals such as U and Th; and (iii) sputtering targets made of highly pure Co having content of impurity elements as follows: Na 0.05 ppm or less; K 0.05 ppm or less; Fe 1 ppm or less; Ni 1 ppm or less; Cr 1 ppm or less; U 0.01 ppb or less; Th 0.01 ppb or less; C 50 ppm or less or 10 ppm or less; and O 100 ppm or less.
USE - Prodn. of highly pure cobalt for sputtering targets for prodn. of VLSI electrodes, conductors and wirings, films, etc..
ADVANTAGE - The cobalt produced has a purity of 5 N (99.999%) or higher having min. amts. of alkali metals, radioactive metals and transition metals. Radioactive elements cause software failure of device elements due to alpha-particles being given off. Alkali metals move easily in gate insulating films and cause impairment of MOS-LSI boundary layer properties.
Dwg.0/0
FS CPI EPI
FA AB
MC CPI: L03-H04D; L04-C10A; L04-C11C; M13-G02; M25-B03; M25-G11; M28-A
EPI: U11-C05C2; U11-C09A; V05-F04B5C; V05-F05C1; V05-F08D1A; X25-A04

L50 ANSWER 11 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1996:661915 HCAPLUS
DN 125:334741
TI The influence of solvent on the extraction of some non-ferrous metals by aliphatic non-chelating aldoximes
AU Bezrukova, N. P.; Taraban'ko, V. E.; Fleitlich, I. Ur.; Kolesnichenko, G. V.
CS Inst. Chem. Nat. Org. Mater., Siberian Branch Russia Acad. Sci., Krasnoyarsk, 660036, Russia
SO Solvent Extraction and Ion Exchange (1996), 14(6), 1017-1036
CODEN: SEIEDB; ISSN: 0736-6299
PB Dekker
DT Journal
LA English
CC 54-2 (Extractive **Metallurgy**)
Section cross-reference(s): 68
AB The influence of different solvents on the extn. ability of aliph. nonchelating aldoximes with respect to CuCl2, NiCl2 and **CoCl2** has been investigated with heptanaloxime as an example. The effect of carbon tetrachloride, toluene, chloroform, 1,2-dichloroethane, caprylic acid on syn-antiisomerization and aggregation of heptanaloxime has been

studied and the consts. of these processes have been calcd. It was aldoxime anti-isomer that formed the extd. complex with metals. The equation of state of nonchelating aldoximes in the extn. systems has been deduced. Taking into account the processes which occur in the org. and aq. phases, the effective extn. consts. have been computed for extn. of metals from **hydrochloric acid** solns. by heptanaloxime in the different solvents. Their values decrease in the order: CCl4>toluene.apprxeq.chloroform>1,2-dichloroethane. For chlorine substituted hydrocarbons the correlations between ET parameter of the solvent and extn. const. have been established.

ST heptanaloxime solvent extn nonferrous metal; **copper** extn heptanaloxime solvent; nickel extn heptanaloxime solvent; cobalt extn heptanaloxime solvent

IT 629-31-2, Heptanaloxime
RL: NUU (Other use, unclassified); USES (Uses)
(solvent effect on the extn. of nonferrous metals by aliph. nonchelating aldoximes)

IT 56-23-5, Carbon tetrachloride, properties 67-66-3, Chloroform, properties 107-06-2, 1,2-Dichloroethane, properties 108-88-3, Toluene, properties 124-07-2, Caprylic acid, properties
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
(solvent effect on the extn. of nonferrous metals by aliph. nonchelating aldoximes)

IT 7440-02-0P, Nickel, preparation **7440-48-4P, Cobalt,** preparation **7440-50-8P, Copper,** preparation
RL: **PUR (Purification or recovery); PREP (Preparation)**
(solvent effect on the extn. of nonferrous metals by aliph. nonchelating aldoximes)

L50 ANSWER 12 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1996:157312 HCAPLUS
DN 124:237854
TI Heavy metals in the environment. Part VI: Recovery of cobalt values from spent cobalt/manganese bromide oxidation catalysts
AU Clark, S. J.; Donaldson, J. D.; Khan, Z. I.
CS Department of Chemistry, Brunel University, Uxbridge, London, UB8 3PH, UK
SO Hydrometallurgy (1996), 40(3), 381-93
CODEN: HYDRDA; ISSN: 0304-386X
PB Elsevier
DT Journal
LA English
CC 54-2 (Extractive **Metallurgy**)

AB Cobalt is recovered from a series of spent cobalt/manganese bromide oxidn. catalysts contg. 27-31% Co, 25-33% Mn, 0-14% Fe together with Cr, **Cu** and Ni. While ammoniacal leaching in the presence of reducing agents can be used to ext. cobalt, the process has to be sep. optimized for each sample. Leaching with 4 M **HCl** at 80.degree.C for 4 h, however, proved successful for all the catalysts. A method of successive neutralization is used for the sepn. of cobalt from the acid solns. Addn. of solid NaOH to pH 2 removes Fe and Cr as hydroxide, while addn. of ammonia to pH 10 ppts. manganese oxide from an aerated soln. leaving Co as a CoIII hexaammine complex. Cobalt can be recovered from this soln. by chem. or electrochem. processes. After crystn. the complex is converted to anhyd. **cobalt chloride** by heating it to 320.degree.C or to Co2O3 by roasting it in air at 500.degree.C. Either of these materials may be readily converted into other cobalt chems. Alternatively, fluidized bed cell electrolysis of the CoIII complex soln. yields cobalt with purity >99.5%.

ST   cobalt recycling catalyst acid leaching
IT   Waste solids
        (oxidn. catalyst; recycling of cobalt from spent oxidn. catalysts by leaching with **hydrochloric acid**)
IT   Recycling
        (recycling of cobalt from spent oxidn. catalysts by leaching with **hydrochloric acid**)
IT   Catalysts and Catalysis
        (waste; recycling of cobalt from spent oxidn. catalysts by leaching with **hydrochloric acid**)
IT   **7440-48-4P, Cobalt,** preparation
     RL: **PUR (Purification or recovery); PREP (Preparation)**
        (recycling of **cobalt** from spent oxidn. catalysts by leaching with **hydrochloric acid**)
IT   **7647-01-0, Hydrochloric acid,** reactions
     RL: RCT (Reactant); RACT (Reactant or reagent)
        (recycling of cobalt from spent oxidn. catalysts by leaching with **hydrochloric acid**)

L50 ANSWER 13 OF 42 METADEX COPYRIGHT 2002 CSA
AN   1997(9):43-260 METADEX
TI   Preparation of cobalt acetate from cobalt chloride by ion exchange.
AU   Ying, J. (Tsinghua University); Han, H. (Institute of Tianjin Petrochemical); Bao, F. (Tsinghua University); Zhu, D. (Tsinghua University); Liu, Y. (Tsinghua University); Wang, L. (Tsinghua University)
SO   Nonferrous Metals (China) (Aug. 1996) 48, (3), 65-69, Graphs, 3 ref.
     ISSN: 1001-0211
DT   Journal
CY   China
LA   Chinese
AB   The pure solution of CoCl2 can be prepared from the low grade cobalt ores by roasting, leaching and purifying. In this paper, the process of preparation of Co(Ac)2 from CoCl2 by ion exchange was studied in detail. A macroporous weakly acidic cation exchange resin was selected. We completed the experiments in single column and multicolumns, chose the suitable operation parameters of ion exchange, suggested a reasonable process and performed the pilot experiment with practical solution. It is showed that the CoCl2 solution can be converted into Co(Ac)2 with ion exchange, at the same time, anions, such as Cl-, SO42-, NO3- and so on, are removed effectively. The recovery of Co is >99.5%, and the prepared Co(Ac)2 solution meets requirements to prepare chemical pure cobalt acetate.
CC   43 Refining and Purification
CT   Journal Article; Cobalt: Extraction; Ion exchanging
ET   Cl*Co; CoCl2; Co cp; cp; Cl cp; Ac*Co; Ac sy 2; sy 2; Co sy 2; Co(Ac)2; Ac cp; Cl; Cl-; Cl in 1; in 1; O*S; SO4; SO42-; S cp; O cp; SO4 in 2; in 2; N*O; NO3; NO3-; N cp; NO3 in 1; Co

L50 ANSWER 14 OF 42 METADEX COPYRIGHT 2002 CSA
AN   1997(9):43-259 METADEX
TI   Purification of cobalt leaching solution by solvent extraction with N235.
AU   He, P. (Tsinghua University); Zhu, D. (Tsinghua University); Fang, J. (Tsinghua University); Bao, F. (Tsinghua University); Zhang, Z. (Tsinghua University); Liu, Y. (Tsinghua University); Wang, L. (Tsinghua University)
SO   Nonferrous Metals (China) (Aug. 1996) 48, (3), 61-64, 4 ref.
     ISSN: 1001-0211
DT   Journal
CY   China
LA   Chinese

AB Distribution ratios of some metals between 30%N235-20% iso-octanol-kerosene organic phase and the chloride solution obtained from roasting and leaching cobalt-sulfur ore, were measured. The extraction order was: Zn>Fe(III)>Cu>Co, Fe(II)>Mn>Ca>Mg. According to the distribution ratios, a process with two fractional extraction sections was designed to get pure cobalt chloride. In the process, 35 centrifugal contactors of 20 mm diameters was used to prepare CoCl2 solution for producing 1.5 kg of Co(Ch 3 COO)2. The results show that the all metal impurities in the CoAl2 except Mn are satisfied for producing Co(CH23COO)2 with chemical purity. The Co loss in the raffinate is <1%. The direct recovery of Co is >94%. The process is feasible and reliable.
CC 43 Refining and Purification
CT Journal Article; Cobalt: Extraction; Purification; Pregnant liquors; Solvent extraction
ET Fe; Cl*Co; CoCl2; Co cp; cp; Cl cp; Co; C*O; COO; C cp; O cp; Al*Co; Al sy 2; sy 2; Co sy 2; CoAl2; Al cp; Mn; C*H*Co*O; Co(CH23COO)2; H cp

L50 ANSWER 15 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1995-066914 [09] WPIX
DNC C1995-029612
TI High purity **nickel chloride mfr.** for electroless **nickel** plating - using recycled waste nickel anodes to reduce environmental pollution.
DC E31 M13
IN AHN, S H; BAE, M H; LEE, J Y; SOHN, J G; AHN, S; BAE, M; LEE, J; SONN, J
PA (POHA-N) POHANG IRON & STEEL CO LTD; (REIN-N) RES INST IND SCI & TECHNOLOGY; (POSC-N) POSCO; (RIST-N) RIST
CYC 19

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PI   WO 9502073     A2 19950119 (199509)* EN   19p    C22B000-00
        RW: AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE
         W: JP US
     EP 663017      A1 19950719 (199533)  EN          C22B023-00       <--
         R: FR
     JP 07507036    W  19950803 (199539)        6p    C01G053-09
     WO 9502073     A3 19950309 (199612)              C22B000-00
     JP 2668287     B2 19971027 (199748)        7p    C01G053-09
     EP 663017      B1 19980930 (199843)  EN          C22B023-00       <--
         R: FR
     US 5853692     A  19981229 (199908)              C01G053-09
     KR 9605510     B1 19960425 (199916)              C01G053-09
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ADT WO 9502073 A2 WO 1994-KR82 19940701; EP 663017 A1 EP 1994-919899 19940701, WO 1994-KR82 19940701; JP 07507036 W WO 1994-KR82 19940701, JP 1995-503965 19940701; WO 9502073 A3 WO 1994-KR82 19940701; JP 2668287 B2 WO 1994-KR82 19940701, JP 1995-503965 19940701; EP 663017 B1 EP 1994-919899 19940701, WO 1994-KR82 19940701; US 5853692 A Cont of WO 1994-KR82 19940701, Cont of US 1995-392846 19950301, US 1997-899956 19970724; KR 9605510 B1 KR 1993-12393 19930702
FDT EP 663017 A1 Based on WO 9502073; JP 07507036 W Based on WO 9502073; JP 2668287 B2 Previous Publ. JP 07507036, Based on WO 9502073; EP 663017 B1 Based on WO 9502073
PRAI KR 1993-12393 19930702
REP FR 2263979; FR 2263980; GB 1598767; US 4221765
IC ICM **C22B023-00**
ICS C01G053-09
AB WO 9502073 A UPAB: 19950306
Mfr. of high purity **NiCl2** comprises: (a) pretreating waste Ni anode obtd. from an electroplating factory of a steel mfg. plant to remove impurities adhered on the surface; (b) working the pretreated waste Ni

anode to increase the specific surface area; (c) placing the processed waste Ni anode into aq. chloric acid soln. of 10-35% to give equiv. ratio of Ni, **HCl** and **NiCl2** 1; (d) dissolving the worked waste Ni anode at a reaction temp. of 20-80deg.C to form aq. **NiCl2** soln.; (e) filtering the aq. **NiCl2** soln. to remove insol. materials; (f) injecting an oxidising gas into an impurity treating tank at pH 2-5 to form Fe and Cr ions into a sludge, carrying out and filtering; and (g) adding 0.1-2.0g/l Ni powder into the aq. **NiCl2** soln. to remove heavy metal ions.

Also claimed is a method as above, but including an extra step: (h) **heat** concentrating the impurity treated **NiCl2** into a crystalline powder.

USE - Used to mfr. **NiCl2** for **mfr.** of a Zn-**Ni** coated steel plate, for electroless Ni plating industry for electronic components. Also used to **mfr.** a high purity chemical additive **Ni** powder.

ADVANTAGE - High purity **NiCl2** can be **mfd.** from waste **Ni** anodes without complicated impurity removal. Also environmental damage by Zn Cl is reduced.

Dwg.0/0

FS CPI
FA AB; DCN
MC CPI: E35-W; M13-B

L50 ANSWER 16 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1996-170261 [17] WPIX
DNC C1996-053677
TI Cobalt and **cobalt chloride** prodn. from cobalt-ferrous concentrate - includes dissolving cobalt-ferrous concentrate in **hydrochloric acid** and **purifying cobalt chloride.**
DC E31 M25 M28
IN MAKOVSKAYA, G V; MOISA, L P; SPIVAKOVSKII, V S
PA (AUME-R) AS UKR METAL PHYS INST
CYC 1
PI RU 2041276 C1 19950809 (199617)* 4p C22B023-00 <--
ADT RU 2041276 C1 SU 1988-4610668 19881130
PRAI SU 1988-4610668 19881130
IC ICM **C22B023-00**
AB RU 2041276 C UPAB: 19960428

Processing the cobal-ferrous concentrate involves prepreg. it by repulping the cake in H2SO, dissolving the concentrate while heating, removing the impurities from the concentrate and producing Co. The novelty of the process is that the concentrate is dissolved in **HCl**, cooled and the **CoCl2** so-obtd. is purified by employing multi-stage countercurrent crystallising purificn. to achieve a specified purity level, after initially filling the apparatus with crystalline **CoCl2** and its satd. solns. on a crystallisation purificn. line and with a **CoCl2** soln. on a Co electro-extn. line. Under these conditions, the spent Co electro-extn. electrolyte is fully satd. with purified **CoCl2**, and part of this soln. (in an amt. equal to the recycled crystallisation mother liquors usage) is supplied to the final **CoCl2** recrystallisation stage. The remainder of the soln. is recycled to the Co electro-extn. stage, and the mother liquor (from the first crystallisation stage), or that part of it that contains (10-33 % of the total concentrate Co content, is used for the acidic repulping of the cobal-ferrous cake after the Fe and Mn (in the form of hydroxides) has been initially sepd. from the mother liquor by treating it with a portion

of the said cobalt-ferrous cake at 70-80 deg.C and pH 0.8-1.2.
USE - In the prodn. of metallic Co and **CoCl2**.
ADVANTAGE - Avoids the generation of industrial effluent, and reduces the consumption of reagents.
Dwg.0/0
FS CPI
FA AB; DCN
MC CPI: E35-V; M25-B02; M25-G11

L50 ANSWER 17 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1992-365412 [44] WPIX
DNN N1992-278560 DNC C1992-162185
TI **Cobalt** metal powder **mfr.** - by **purifying** hexamine **cobalt chloride** soln. then decomposing to oxide material and reducing.
DC A91 E31 M22 P53
IN CHERESNOWSKY, M J; KIM, T K; MILLER, M J; WOLFE, T A
PA (SYLV) GTE PROD CORP
CYC 1
PI US 5154757 A 19921013 (199244)* 4p B22F009-00
ADT US 5154757 A US 1991-783752 19911028
PRAI US 1991-783752 19911028
IC ICM B22F009-00
ICS **C22B023-00**
AB US 5154757 A UPAB: 19931116
Co contg. solids contg. Ca++, Cd++ and/or Mg++ as impurities are converted to a hexamine cobalt (III) chloride soln. and fed through a cation **exchange resin** to remove impurities.. Purified soln. is then pH adjusted to 12.5-13 to decompose the hexamine cobalt (III) soln. to an insol. cobalt oxide contg. material for sepn. from the soln. and redn. to pure cobalt metal powder prod..
USE/ADVANTAGE - Impure Co contg. solids are scrap WC mine or cutting tool bits, scrap Co metal or scrap cathodes, Prod. is used in mfr. of cemented carbide cutting tool
Dwg.0/0
FS CPI GMPI
FA AB; DCN
MC CPI: A12-M03; E11-Q02; E32-A04; E34-B; E34-D; E35-D; M22-H01

L50 ANSWER 18 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1989-227317 [31] WPIX
DNC C1989-100979
TI **Cobalt purificn.** - by precipitating **cobalt** hydroxide from hex ammine **cobalt chloride** soln., washing and firing.
DC E31 J01 M25
IN CHRISTINI, J N; HUSTED, E F; LADD, J A; MILLER, M J; SCHWARTZ, A R
PA (SYLV) GTE PROD CORP
CYC 1
PI US 4840776 A 19890620 (198931)* 3p
ADT US 4840776 A US 1987-107078 19871013
PRAI US 1987-107078 19871013
IC C01G051-00; **C22B023-00**
AB US 4840776 A UPAB: 19950117
(i) NaOH is added to hexammine cobalt (III) chloride soln. at 80 deg.C at least to ppte. cobaltic hydroxide. Rate of addn. is below 0.22 moles NaOH/mole Co/min and amt. added is below 1.4 times the stoichiometric amt. needed to ppte. the hydroxide. (ii) after solid/liq. sepn. the hydroxide

is washed with hot deionised H2O to remove Na to a level below 60ppm, and (iii) fired at 180-850 deg.C to remove H2O and NHz to below a 200ppm. level.

USE/ADVANTAGE - Chloride soln. in (i) can be obtd. from digestion of Co scrap in **HCl** followed by addn. of NH3. Prod. is reducible to pure metal powder for use in cemented carbide mfr.

0/0

Dwg..0/0

FS CPI
FA AB; DCN
MC CPI: E35-V; J01-B; M25-B01; M25-G11

L50 ANSWER 19 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1989:427270 HCAPLUS
DN 111:27270
TI Manufacture of metal composites
IN Nishimura, Takanobu; Ishiwatari, Yutaka
PA Toshiba Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C22F001-00
CC 56-4 (Nonferrous **Metals** and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63290251	A2	19881128	JP 1987-124046	19870522

AB The composites esp. for robot and automobile parts are manufd. by forming a SiC fiber or whisker preform and infiltrating a molten Al alloy into the preform. The SiC fibers or whiskers are prepd. by rinsing with a HF soln. to adjust SiO2 content (<1%) of the fibers and by coating with Ni, **Cu**, Co, Ag, Au, P, Cr, or their alloys. Thus, SiC whiskers contg. 4.5% SiO2 were mixed for 30 min with an aq. soln. contg. 10% HF, the mixt. was filtered, water rinsed, and dried. The obtained SiC whiskers contg. 0.3% SiO2 were immersed for 10 min into an aq. soln. contg. 10 g SnCl4 and 40 cm3 **HCl**, and then a Ni coating soln. contg. **NiCl2** 5, N2H4.**HCl** 3, and Na tartrate 4.6 g/L to form a 0.1-.mu.m Ni coating layer. The preform from the prepd. SiC whiskers (12 vol.%) was infiltrated with AA 6061 Al alloy and the obtained reinforced composite was **heat** treated. The resp. tensile strength, yield strength, Vickers hardness, and Young's modulus for the obtained composite were 36.0, 25.0 kg/mm2, 160, and 9 .times. 103 kg/mm2 vs. 20.0, 10.5 kg/mm2, 60, and 7.5 .times. 103 kg/mm2 for an Al alloy composite prepd. similarly by using nontreated SiC whiskers.

ST silicon carbide aluminum alloy composite; whisker silicon carbide composite; silica removal silicon carbide composite; nickel coating silicon carbide composite

IT 409-21-2P, Silicon carbide (SiC), uses and miscellaneous
RL: PEP (Physical, engineering or chemical process); **PREP (Preparation)**; PROC (Process)
(composites of **nickel**-coated whiskers of, with aluminum alloy, manuf. of)

IT **7440-02-0P, Nickel**, uses and miscellaneous
RL: PEP (Physical, engineering or chemical process); **PREP (Preparation)**; PROC (Process)
(composites of silicon carbine whiskers coated with, with aluminum alloy, manuf. of)

IT 12616-75-0P, AA6061
RL: PEP (Physical, engineering or chemical process); **PREP (Preparation)**; PROC (Process)
(composites with **nickel**-coated silicon carbide whiskers, manuf. of)
IT 7631-86-9, Silica, uses and miscellaneous
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(removal of, from silicon carbide whiskers, in manuf. of aluminum alloy composites)

L50 ANSWER 20 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1987:35474 HCAPLUS
DN 106:35474
TI Preparation of **cobalt chloride** from cobalt-containing sludge from nickel electrowinning
AU Wei, Yihai; Yang, Zhi Kuan; He, Dongbao; Wang, Dingjiang; Wu, Xusen
CS Xinyang Army Mil. Coll., Peop. Rep. China
SO Huaxue Shijie (1986), 27(11), 510-13
CODEN: HUAKAB; ISSN: 0367-6358
DT Journal
LA Chinese
CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): **54**
AB Co sludge from Ni electrowinning was dissolved in H2SO4, mixed with NaClO3 at 70.degree. for removal of Fe, filtered, extd. with fatty acids for removal of **Cu**, mixed with Na2CO3 for pptn. of Co and Ni, filtered, and the cake was dissolved in **HCl**, extd. with a tertiary amine for sepn. of Co, extd. with aq. **HCl**, and crystd. to obtain **CoCl2**. The Co recovery was .gtoreq.97% and the **CoCl2**.6H2O was 99.06% pure.
ST **cobalt chloride** manuf slag; nickel electrowinning slag **cobalt chloride**
IT Slimes and Sludges
(nickel electrowinning, **cobalt chloride** manuf. from)
IT **7646-79-9P, Cobalt chloride**, preparation
RL: **IMF (Industrial manufacture); PREP (Preparation)**
(manuf. of, from nickel electrowinning sludge)

L50 ANSWER 21 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1985-267359 [43] WPIX
DNC C1985-115912
TI **Mfg**. mixed soln. of **nickel** and **cobalt chloride**(s) - involves heating oxide(s) and/or hydroxide(s), washing out sulphate, impurities and dissolving in **hydrochloric acid**.
DC E31
PA (SUMM) SUMITOMO METAL MINING CO
CYC 1
PI JP 60180921 A 19850914 (198543)* 3p
ADT JP 60180921 A JP 1984-33712 19840224
PRAI JP 1984-33712 19840224
IC C01G051-08; C01G053-09; **C22B023-04**
AB JP 60180921 A UPAB: 19930925
Oxides and/or hydroxides of trivalent Ni and Co contg. SO4 ions are heated at temp. of 750-900 deg.C. The fired prod. is washed and dissolved in **HCl**.
Heating is done pref. at temp. of 800-850 deg.C for over 30 minutes.

By heating SO4 in the fired prod. is transferred to water in washing step, and removed from the residue. Small amounts of Ni and Co in washing water are recovered by pptn. or using **ion-exchange resins**.

ADVANTAGE - When by-prods., e.g. ppte. obtd. from Ni electrolyte, treated by the method, is dissolved in **HCl**, Cl2 gas does not generate and mixed solution of **NiCl2** and **CoCl2** formed contains little SO4. In an example, to remove Co in Ni electrolyte, the electrolyte was oxidised with Cl2 gas and neutralised with Ni2CO3. Ppte formed contained 34.4 wt.% Ni, 15.3 wt.% Co, 6.7 wt.% So42-. 60g of the precipitate were heated at 800 deg.C for 60 minutes. 20g of the fired prod. and 200 ml of water in 500 ml beaker were stirred at 55 deg.C for 30 minutes. 10g of the residue obtained by filtration and 36.5 ml 25 wt.% **HCl** were stirred in 200 ml beaker to dissolve the residue in **HCl**. Amts. of Cl2 gas generated was 0.013 g and SO4 amts. in mixed soln. was 0.058 g.
0/0

FS CPI
FA AB
MC CPI: E35-V; E35-W

L50 ANSWER 22 OF 42 METADEX COPYRIGHT 2002 CSA
AN 1985(10):43-206 METADEX
TI Extra-Clean Metals. Advanced Purification of Nickel and Iron.
AU Dinu, M.
SO Metalurgia (Bucharest) (Nov. 1983) 35, (11), 599-603
ISSN: 0461-9579
DT Journal
LA Romanian
AB A brief review on obtaining high purity metals by ion-exchange chromatography is given. Positive results have been obtained especially using neutral NiCl2 solutions for high purity Ni with very low contaminations of Fe (2.1 ppm)Co, (n.d.)Cu, (0.1 ppm). Comparative data on composition of the obtained metal are given, using different purification methods. Good results may be achieved using the same method for Fe purification. 10 ref.-R.Z.
CC 43 REFINING AND PURIFICATION
CT Nickel: Refining; Iron: Refining; Purification; Ion exchanging; Chromatography
ET Cl*Ni; NiCl2; Ni cp; cp; Cl cp; Ni; Fe; Co; Cu

L50 ANSWER 23 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1984:55093 HCAPLUS
DN 100:55093
TI Recovery of cobalt from mixtures with other elements
IN Oproiu, Letitia; Totoiu, Ana
PA Intreprinderea de Utilaj Chimic, Rom.
SO Rom., 2 pp.
CODEN: RUXXA3
DT Patent
LA Romanian
IC C01G051-04
CC 54-2 (Extractive **Metallurgy**)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	RO 80190	B	19821206	RO 1980-100242	19800220

AB To achieve high purity and quant. sepn. of Co from mixts. with Fe, Cr, Ni,

Cu, Ti, Al, W, the heterogeneous mixt. in the form of powder or shavings is dissolved in **HCl**. The insol. elements are sepd. by filtration and the soln. heated to 105.degree. to evap. the excess **HCl**. The soln. of chlorides is treated with NH3 and NH4Cl to pH 5-5.5 to ppt. all impurities. The filtered ppt. is redissolved, repptd., and filtered. The solns. contg. **CoCl2** are heated to 50.degree. and treated with oxalic acid under const. stirring at pH 3.5-4. The pptd. Co oxalate is filtered, dried, and calcined at 800-1000.degree. to CoO, which is reduced to metal powder at 450-500.degree. in an atm. of H and N. The yield of Co is 96-7%.

ST cobalt recovery metal mixt; **hydrochloric acid** leaching cobalt

IT **7440-48-4P**, preparation
RL: **PUR (Purification or recovery); PREP (Preparation)**
(recovery of, from metal mixt. by leaching with **hydrochloric acid**)

L50 ANSWER 24 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1982-44184E [22] WPIX
TI Forming cobaltous chloride from cobaltic cpd. - by dissolving cpd. in **hydrochloric acid** contg. organic reducing agent.
DC E31 M25
IN DEVUYST, E A; ETTEL, V A; ILLIS, A
PA (INTN) INCO LTD
CYC 6
PI EP 52444 A 19820526 (198222)* EN 11p
R: BE FR GB
ZA 8107436 A 19820820 (198243)
US 4394366 A 19830719 (198331)
CA 1158018 A 19831206 (198402)
PRAI CA 1980-364745 19801114
REP DE 1079019; US 4151258
IC C01G051-08; C01G053-08; **C22B023-04**
AB EP 52444 A UPAB: 19930915
CoCl2 is **prepd.** from a trivalent **Co** cpd. by (a) forming an aq. slurry of the Co (III) cpd; and (b) treating with **HCl** in the presence of an organic reductant capable of reducing Co (III) to Co (II), with **HCl** added at a rate maintaining slurry pH not less than 1, so Co (III) is reduced and dissolved as Co (II).

The reductant is pref. a 1-4C alcohol or alcohol oxidn. prod., esp. methanol, formaldehyde or formic acid, pref. used in excess for reducing all Co (III) or Co (II). It may be added in admixt. with **HCl**. Reaction is pref. at over 75 deg.C. The resulting soln. is pref. evapd. to yield crystallised **CoCl2**.

The **CoCl2** formed is also claimed. Forms **CoCl2** for Co recovery from e.g. **Co**(OH)3 byprod. from **purificn.** of Ni electrolytes in Ni electrorefining or electrowinning plants or purificn. of Ni leach solns., without Cl2 generation.
FS CPI
FA AB
MC CPI: E35-V; M25-B; M25-E; M25-G11

L50 ANSWER 25 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1982:566786 HCAPLUS
DN 97:166786
TI Purification of **cobalt chloride** solutions. The winning of very pure metal and its characterization
AU Bourahla, M.; Bouquet, G.; Dubois, B.

CS SONAREM, Algeria
SO Proc. - Int. Conf. Cobalt: Metall. Uses (1981), Volume 1, 107-23
Publisher: Benelux Metall., Brussels, Belg.
CODEN: 47XNAJ
DT Conference
LA English
CC 54-3 (Extractive Metallurgy)
AB Co was purified by soln. in **HCl**, removal of Fe to 5 .times. 10-4% by **extn**. with MIBK, removal of Ni to 8 .times. 10-4% by **ion exchange** on Dowex 1 .times. 8 resin, and electrolysis. Electrolysis gave Co of >99.998% purity (anal. for 31 elements is given). Ultimate purifn. by zone melting gave Ni and Fe values of <0.4 .times. 10-4 and 1 .times. 10-4%, resp. Microstructure, internal friction, elec. resistance, and recrystn. of pure Co are discussed.
ST cobalt purifn property; iron removal cobalt purifn; nickel removal cobalt purifn; solvent **extn** cobalt purifn; **ion exchange** cobalt purifn; electrolysis cobalt purifn
IT **7440-48-4P**, preparation
RL: **PUR (Purification or recovery); PREP (Preparation)**
(purifn. of)
IT 7439-89-6, uses and miscellaneous 7440-02-0, uses and miscellaneous
RL: REM (Removal or disposal); PROC (Process)
(removal of, from cobalt)

L50 ANSWER 26 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1980-45144C [26] WPIX
TI **Purificn**. of aq. acid **nickel chloride** solns.
- contg. cobalt, **copper**, iron or zinc, by selective extn. with an organic solvent soln. of tri butyl phosphate.
DC E31 M25
IN LEAVER, H S; MEYER, G A; PETERS, M A
PA (AMMX) AMAX INC
CYC 9
PI BE 881559 A 19800530 (198026)*
DE 3005447 A 19800828 (198036)
NL 8000100 A 19800819 (198036)
GB 2041345 A 19800910 (198037)
US 4221765 A 19800909 (198039)
JP 55113845 A 19800902 (198042)
JP 55113846 A 19800902 (198042)
BR 8000840 A 19801029 (198046)
FR 2449064 A 19801017 (198048)
CA 1138650 A 19830104 (198306)
GB 2041345 B 19830309 (198310)
PRAI US 1979-12782 19790216
IC B01D011-04; C01G053-09; **C22B023-04**
AB BE 881559 A UPAB: 19930902
Aq. acid Ni chloride solns. contg. 50-320 g./l. Ni, opt. >=1 g./l. Co, and >=1 impurity chosen from **Cu**, Fe and Zn, with a conc. of free **HCl** of 0.2-4 N and a total chloride conc. of 4-11 N, are purified by extn. with a solvent. The extn. agent used is a mixt. of 5-70vol. % tributylphosphate in a water-immiscible organic solvent, the ratio organic soln./aq.soln. being chosen such that a major amt. of the impurity is extd. from the aq. soln. The organic and aq. solns. are then sepd. to give an aq. Ni chloride soln. impoverished w.r.t. the impurity, and an organic soln. charged with the impurity.
Process gives good **purificn**. of crude **Ni** chloride

solns. contg. impurities such as Co, **Cu**, Fe or Zn, to give solns suitable for recovery of marketable Ni. The process is esp. useful for extn. of Ni chloride solns. obtd. by **HCl** leaching of nickeliferous sulphide materials as described in BE 881560.

FS CPI
FA AB
MC CPI: E05-G09C; E35-W; M25-B; M25-G19

L50 ANSWER 27 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1979-18470B [10] WPIX
TI Extraction of impurities from a molten nickel matte - involves chlorinating the matte under a molten salt layer.
DC M25
PA (INTN) INCO LTD
CYC 3
PI FR 2393072 A 19790202 (197910)*
GB 1563589 A 19800326 (198013)
CA 1095730 A 19810217 (198111)
PRAI GB 1977-22872 19770531
IC **C22B023-04**
AB FR 2393072 A UPAB: 19930901
The matte contg. Fe, **Cu**, Co, Pb, Cr, Zn, Mn, Cd as impurities, is purified by chlorinating the molten matte so that the impurities are chlorinated. The treatment is effected under a molten salt layer comprising >=1 alkaline metal chloride which dissolves the chloride(s) formed, the impurity-contg. salt then being sepd. from the molten matte and being converted to solid fragments. The fragments are leached with a satd. aqs 2 contg. the alkaline metal chloride(s) present, with a pH <5, to dissolve the metallic chloride(s). The impurity-contg. aq. soln is then sepd. to produce the purified salt. The leaching process lasts no longer than 10 mins and the aq. leaching soln also contains dissolved **nickel chloride** at >=50 g/l but not sufficient to saturate the leach soln.

The salt is **purified** without the **nickel chloride** being transferred to the leach soln. so that a nickel recuperation is no necessary.

FS CPI
FA AB
MC CPI: M25-B; M25-G19

L50 ANSWER 28 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1977:409196 HCAPLUS
DN 87:9196
TI Recovery of useful metals from nodules deposited in the ocean bed
PA Deepsea Ventures, Inc., USA
SO Japan., 13 pp.
CODEN: JAXXAD
DT Patent
LA Japanese
IC C22B003-00
CC 54-2 (Extractive **Metallurgy**)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 51044881	B4	19761201	JP 1971-36171	19710526
	JP 55004817	B4	19800201	JP 1976-64031	19760601

PRAI JP 1971-36171 19710526
AB Metal-contg. nodules deposited on the ocean bed are treated with

HCl to form aq. solns. of metal chloride(s) (e.g., chlorides of Mn, Ni, and Co) and leached with an org. solvent contg. a liq. **ion -exchanging** agent. The resulting metal chloride-contg. solns. are treated with H2SO4 for removal of the liq. **ion-exchanging** agent and electrolyzed to recover the metals. Thus, nodules contg. Mn 27.7, Ni 1.30, **Cu** 1.06, Co 0.26, and Fe 6.03% were crushed to -35 mesh, reacted with **HCl** at 500.degree. for 2 h, leached with water to give a soln. contg. MnCl2 200 (as Mn), **NiCl2** 9.46 (as Ni), CuCl2 7.68 (as **Cu**), and **CoCl2** 1.83 (as Co) g/L, filtered, and extd. with an org. solvent contg. Kelex 100 to sep. the CuCl2 in the soln. The CuCl2 contg. soln. was then treated with H2SO4 and electrolyzed to recover **Cu**. Similarly, the remaining MnCl2-, **NiCl2**-, **CoCl2**-, and FeCl2-contg. soln. was extd. with a suitable org. solvent to recover Mn, Ni, and Co.

ST **copper** recovery manganese nodule; nickel recovery manganese nodule; cobalt recovery manganese nodule

IT Nodules
RL: PROC (Process)
(manganese, leaching and extn. of, for metal recovery)

IT 7439-89-6P, preparation **7440-02-0P**, preparation **7440-48-4P**, preparation **7440-50-8P**, preparation
RL: **PUR (Purification or recovery)**; **PREP (Preparation)**
(recovery of, from manganese nodules by leaching and extn.)

IT 7439-96-5P, preparation
RL: PUR (Purification or recovery); PREP (Preparation)
(recovery of, from nodules by leaching and extn.)

L50 ANSWER 29 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1977:45882 HCAPLUS
DN 86:45882
TI Hydrometallurgical process for the treatment of nickel matte
IN Demarthe, Jean M.; Gandon, Louis; Goujet, Monique
PA Societe Metallurgique le Nickel, Fr.
SO Ger. Offen., 70 pp.
CODEN: GWXXBX
DT Patent
LA German
IC C22B023-04
CC 54-2 (Extractive Metallurgy)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 2601534	A1	19761202	DE 1976-2601534	19760116
	DE 2601534	B2	19770317		
	DE 2601534	C3	19771027		
	FR 2297925	A1	19760813	FR 1975-1264	19750116
	FR 2334756	A2	19770708	FR 1975-38166	19751212
	BE 837406	A1	19760708	BE 1976-163385	19760108
	SE 7600283	A	19760719	SE 1976-283	19760113
	SE 458204	B	19890306		
	SE 458204	C	19890629		
	AU 7610232	A1	19770721	AU 1976-10232	19760113
	AU 499399	B2	19790412		
	FI 7600071	A	19760717	FI 1976-71	19760114
	FI 65813	B	19840330		
	FI 65813	C	19840714		
	ZA 7600204	A	19761229	ZA 1976-204	19760114

	NO 7600138	A	19760719	NO 1976-138	19760115
	NO 146993	B	19821004		
	NO 146993	C	19830112		
	BR 7600227	A	19760831	BR 1976-227	19760115
	GB 1484121	A	19770824	GB 1976-1657	19760115
	NL 7600461	A	19760720	NL 1976-461	19760116
	NL 188296	B	19911216		
	NL 188296	C	19920518		
	JP 51098622	A2	19760831	JP 1976-4563	19760116
	JP 60018733	B4	19850511		
	ES 444363	A1	19771001	ES 1976-444363	19760116
	US 4173520	A	19791106	US 1977-849603	19771108
	US 4236981	A	19801202	US 1979-54888	19790705
	SE 8008714	A	19801211	SE 1980-8714	19801211
	SE 446747	B	19861006		
	SE 446747	C	19870122		
PRAI	FR 1975-1264		19750116		
	FR 1975-38166		19751212		
	US 1976-649744		19760116		
	US 1977-849603		19771108		

AB High-purity Ni and Co are recovered from Ni matte contg. Ni .apprx.75, Co 1.5-2, and Fe 2-4%. The matte is ground and leached in a FeCl3 soln. by passing through Cl, which oxidizes Fe(II) to Fe(III). FeCl3 is partially extd., and Ni is sepd. from Co and the residual Fe by **ion exchange**. Ni is obtained from the purified NiCl2 soln. by electrolysis. Thus, a Ni matte contg. Ni 77.5, Co 1.62, Fe 1.9, and S 17.8% was ground to 125.mu. and suspended in an FeCl3 soln. The suspension was leached at 95.degree. for 6 h in a reactor with blowing of Cl gas to maintain a const. redox potential of 700 mV. The Fe(III) was partially extd. by a (BuO)3PO (TBP) soln. with aq.-to-org. phase ratio of 1.5. After partial **extn.** of FeCl3, the soln. was passed through an **ion-exchange** resin IRA 400 C to obtain a purified NiCl2 soln. and a soln. of FeCl3 and **CoCl2**. The NiCl2 soln. was subjected to electrolysis to obtain Ni and Cl. The FeCl3 from the TBP soln. was reextd. in 0.1N **HCl** and returned for leaching the Ni matte. The recovery of Ni from the matte into the soln. after leaching was 96%.

ST nickel cobalt recovery matte; chlorine leaching nickel matte; iron chloride leaching nickel

IT 7705-08-0, uses and miscellaneous
RL: RCT (Reactant)
(leaching by, of matte contg. cobalt and nickel)

IT 7440-02-0P, preparation **7440-48-4P**, preparation
RL: **PUR (Purification or recovery); PREP (Preparation)**
(recovery of, from matte, by leaching with iron chloride)

L50 ANSWER 30 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1976:124830 HCAPLUS
DN 84:124830
TI Purification of **nickel chloride** solutions
IN Sabot, Jean L. F.; Rosset, Robert H.
PA Le Nickel, Fr.
SO Fr. Demande, 10 pp.
CODEN: FRXXBL
DT Patent
LA French
IC C01G
CC 54-2 (Extractive **Metallurgy**)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2263980	A1	19751010	FR 1974-8279	19740312
	FR 2263980	B1	19761217		

AB **NiCl2** derived from Ni ores by leaching with **HCl** contains Fe(II), Fe(II), Co (II), **Cu**(II), etc. impurities which yield impure Ni. A synthetic **NiCl2** soln. was prepd. consisting of **NiCl2** 0.25, FeCl2 0.25, and CaCl2 5 mole/l., to simulate **NiCl2** in industrial practice. The soln. was heated at 75.degree. to reduce soln. viscosity and kept under N or inert gas atm. to prevent oxidn. of Fe(II). The soln. was passed through an **ion-exchange** resin column contg. Dowex 2X10 [56690-56-3], anionic quaternary NH4-type, 100-200 mesh (20 cm .times. 1 cm2) at 13 ml/hr. The eluate was almost pure **NiCl2**. The Fe(II) was eluted from the resin with 0.1N **HCl** or pure water.

ST **nickel chloride** purifn **ion exchange** ; iron removal **nickel chloride**

IT **7440-02-0P**, preparation
RL: **PREP (Preparation)**
(from chloride solns., purifn. by **ion exchange** for)

IT 56690-56-3
RL: PROC (Process)
(in iron removal from **nickel chloride** solns.)

IT **7718-54-9P**
RL: PUR (Purification or recovery); PREP (Preparation)
(purifn. of, by **ion exchange**)

IT 7439-89-6, uses and miscellaneous
RL: REM (Removal or disposal); PROC (Process)
(removal of, from **nickel chloride** solns. by **ion exchange**)

L50 ANSWER 31 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1974:415574 HCAPLUS
DN 81:15574
TI Reduction of metal chlorides with hydrogen
IN Gravenor, Conrad Percival; Rigg, Tyson
PA Research Council of Alberta
SO Ger., 8 pp.
CODEN: GWXXAW
DT Patent
LA German
IC C21B; C22B
CC 54-2 (Extractive **Metallurgy**)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 1433356	A1	19730215	DE 1964-R39072	19641022
	DE 1433356	B2	19731220		
	DE 1433356	C3	19740718		
	SE 325137	B	19700622	SE 1964-12657	19641021
PRAI	GB 1963-42028	A	19631024		

AB The extn. of metallic Fe, Ni, and Co by reducing their chloride salts with hot H is described. The process consists essentially of 3 steps: (1) scrap Fe of approx. compn. C 0.08-0.13, Ni+**Cu** 0.01-0.05, Mn 0.6-1, S 0.08-0.33 %, and the balance Fe and Fe2O3, was converted to FeCl2 by reacting with aq. **HCl** at 90.degree., (2) crystn. of FeCl2.cntdot.4H2O from the soln. and drying the crystals with partial

oxidn. to give a compn. of $FeCl_2$ 72.5-82, Fe_2O_3 3-7, impurities 0.1-0.5, and H_2O 15-20%, and (3) the pellets (1800g) were fed to a heated converter and reduced with a mixt. of H, H_2O, N, and CH_4 at 0.21 kg/cm2 and 780.degree. until the completion of reaction.

ST iron chloride redn hydrogen; nickel chloride redn hydrogen; **cobalt chloride** redn hydrogen; metal chloride redn hydrogen

IT 7439-89-6P, preparation 7440-02-0P, preparation **7440-48-4P**, preparation
RL: **PREP (Preparation)**
(from chloride, by hydrogen redn.)

L50 ANSWER 32 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1973:19142 HCAPLUS
DN 78:19142
TI Solvent extraction in nickel metallurgy. Falconbridge Matte Leach process
AU Wigstoel, Eivind; Froeyland, Kjell
CS Falconbridge Nikkelverk A/S, Kristiansand, Norway
SO Ingenieursblad (1972), 41(17), 476-86
CODEN: INBLAF
DT Journal
LA English
CC 54-2 (Extractive **Metallurgy**)
AB Ni is sepd. from **Cu**- and Pt-contg. matte by **HCl** leaching. The soln. is purified and **$NiCl_2$**.$4H_2O$ is crystd. The metallic Ni is produced by one of the 3 processes from the crystals: electrolysis, direct redn., or **high-temp**. hydrolysis to oxide followed by H redn. The whole plant is computer controlled.
ST nickel manuf matte leaching
IT **7440-02-0P**, preparation
RL: **PREP (Preparation)**
(from **copper**- and platinum-contg. matte, by acid leaching and redn.)

L50 ANSWER 33 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1970:114138 HCAPLUS
DN 72:114138
TI **Separating** nickel as chloride crystals from solutions of cobalt salts
IN Kubo, Teruichiro; Taniguchi, Masao
PA Miyazaki, Kiyoshi
SO S. African, 12 pp.
CODEN: SFXXAB
DT Patent
LA English
CC 54 (Extractive Metallurgy)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	ZA 6902523		19691017		
PRAI	JP		19680904		

AB A more complete sepn. of Ni and Co than that provided by the difference in decompn. temp. of the carbonyls, or the selective oxidn. of Co from a chloride soln. of both metals, is obtained by blowing **HCl** gas into a soln. contg. both chlorides to sat. the soln. so that the soly. of $NiCl_2$ is decreased and crystals of hydrated $NiCl_2$ are pptd., leaving **$CoCl_2$** unaffected in the soln. This pptn. and sepn. are also effective in sulfate solns., although the efficiency is better with low sulfate concn. The hydrated crystals are much more easily filtered out

than hydroxides. Fe and Cr can be sepd. from Ni and Co in soln. by known **ion-exchange** me thods or pH adjustment. The details of several sepns. by this method are presented. After **HCl** gas was blown for 190 min into 3 l. of soln. contg. Ni 25.12, Co 25.4, and Fe 51.6 g/l., 280 g hydrated NiCl2 crystals were filtered out, contg. 28.95% Ni and 0.01% each of Fe and Co, and the filtrate con tained Fe 36.85, Co 18.14, and Ni 0.17 g/l. This soln. was heated to remove excess **HCl** down to 20%, and 80 g Fe lat he chips was added, to give a soln. contg. ferrous Fe 78.21, Co 24.5, an d Ni 0.23%. **HCl** gas was blown as previously into this soln. to ppt. 672 g hydrated FeCl2 crystals contg. 34.17% Fe and 0.01% Co, and when this was filter ed out the filtrate contained Co 17.45, Ni 0.16, and Fe 1.2 g/l. This small amt. of Fe was easily removed by an **ion-exchange** resin, leaving Co of acceptable com. purity.

ST nickel Co sepn; cobalt Ni sepn; chlorides Co Ni sepn
IT 7440-02-0P, preparation
RL: **PREP (Preparation)**
(sepn. of, from **cobalt** in solns. by chlorination)
IT **7440-48-4P**, preparation
RL: **PREP (Preparation)**
(sepn. of, from nickel in solns. by chlorination)

L50 ANSWER 34 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1969:441708 HCAPLUS
DN 71:41708
TI Preparation of high-purity nickel and cobalt
IN Brooks, Parkman T.
PA United States Dept. of the Interior
SO U.S., 3 pp.
CODEN: USXXAM
DT Patent
LA English
IC C22D
NCL 204112000
CC 56 (Nonferrous **Metals** and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 3446720	A	19690527	US 1965-428585	19650127

AB A simple, economical, and efficient process is provided for sepg. Fe and other metallic impurities, particularly Zn, from aq. solns. of Ni and Co. E.g., anolyte from an electrorefining operation was treated to sep. Co, **Cu**, Fe, and Zn from Ni. This pH 1.4 soln. contained Ni 100, Co 1.9, **Cu** 0.010, Fe 0.14, Zn 0.010, Cl- 160, and SO42- 60 g./l. The soln. was oxidized with Cl to convert Fe++ to the extractable Fe+++ state. **Cu**+, if present, also was oxidized to **Cu**++. The soln. was passed countercurrently through 3 mixer-settler extractors by using 0.2M dodecenyltrialkylmethylamine. **HCl** in aromatic solvent. An aq.-to-org. phase ratio of 2 was used. More than 95% of the Fe and Zn, <0.001% of the Co and Ni, and 4% of the **Cu** were extd. The ext. phase was then stripped countercurrently with water, by using 3 mixer-settler units at an org.-to-aq. phase ratio of 12. The barren org. phase was recycled to the solvent extn. operation. The Fe-rich strip soln. contained, typically Fe 3.3, Zn 0.17, **Cu** 0.01, Co 0.06, and Ni 0.008 g./l. The Ni-bearing soln., freed of Fe and Zn, was passed countercurrently through a disk-type vertical extn. column equiv. to nearly 5 theoretical extn. stages, by using 0.5M triisooctylamine. **HCl** in aromatic solvent. An aq.-to-org. ratio of 1 was used.

Better than 99% of the Co and **Cu** were extd. from the Ni-bearing soln., which was then treated by electrolysis for recovery of high purity Ni. The Ni plated from soln. purified in this manner contained <100 ppm. of metallic impurities including Pb 10, Si 10, Si, Na <10, Al 5, As 5, Mg 4, Mo 4, Fe 3, **Cu** 1, and Co 0.2 ppm. The org. ext. stream from the mixer-settlers contained Co 1.9, **Cu** 0.01, and Ni <0.05 g./l. This was stripped countercurrently with water in 8 mixer-settlers at an org.-to-aq. ratio of 20 to give (1) a Co-free org. phase, and (2) a **CoCl2** soln. contg. Co 38, **Cu** 0.2, and Ni 0.3 g./l. The barren org. phase was recycled to the Co extn. operation and the **CoCl2** strip soln. was treated with Co metal to remove **Cu** by cementation. The decoppered soln. was treated electrolytically for recovery of Co metal which contained, typically, <200 ppm. of metallic impurities including **Cu** 100, Ni 29, Zn 20, Fe 18, and Na <10 ppm.

ST nickel purifn; cobalt purifn; iron removal Ni Co
IT Naphtha
RL: PRP (Properties)
(as solvent in nickel recovery from waste electrolytes)
IT Dodecenylamine, alkyl derivs.
RL: USES (Uses)
(in recovery of nickel from waste electrolytes)
IT 25429-07-6
RL: USES (Uses)
(in recovery of nickel from waste electrolytes)
IT 7440-02-0P, preparation **7440-48-4P**, preparation
RL: **PREP (Preparation)**
(recovery of, from waste electrolytes)
IT 7439-89-6, uses and miscellaneous 7440-66-6, uses and miscellaneous
RL: USES (Uses)
(sepn. of, in nickel recovery from waste electrolytes)

L50 ANSWER 35 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1970:114437 HCAPLUS
DN 72:114437
TI Purification of **cobalt chloride** by solvent **extraction** and by **ion exchange** chromatography. Production and properties of high-purity cobalt
AU Dubois, Bernard; Rocquet, F.; Nardin, M.; Vu Quang Kinh
CS Lab. Met., Ecole Nat. Super. Chim., Paris, Fr.
SO Mem. Sci. Rev. Met. (1969), 66(9), 683-90
CODEN: MRMTAU
DT Journal
LA French
CC 56 (Nonferrous **Metals** and Alloys)
AB Fe is 1st extd. (.apprx.99%) into Me iso-Bu ketone from aq. **CoCl2** (obtained by electrolytic dissoln. of 99.7% Co into aq. **HCl**) with 1-6M **HCl** acidity. The **CoCl2** is then put onto the Dowex 1-X8 anion exchange resin (200-400 mesh) in 6M **HCl**. Washing the column with 6M **HCl** removes: Sc, Ti, V, Cr(III), Mn, Ge, As(V), Zr, Ag, Th, Hf, W(VI), Ni, Pb, and Fe(II). Co3+ is then eluted with 3M **HCl**; Ga, Mo, Pd, Cd, Sn, Sb, Te, Pt, Au, Hg, Tl, Bi, U(VI), **Cu**, Zn, and Fe(III) are retained on the column. After the excess acid is evapd. from the exchange purified **CoCl2** soln., the soln. is preelectrolyzed 1st at low c.d. eliminating impurities more e lectropos. than Co2+, and then it is electrolyzed at 10 A/dm2 depositing .apprx.60% of the Co; both electrolyses are done at pH 3 and 50.degree.C. Low-temp. resistivity ratio (62 .times. 10-4 for

20.3.degree.K/294.degree.K) detns. showed that the exchange purified, .gtoreq.99.998%, Co had 0.5 ppm Ni (reduced from an initial 1500 ppm Ni). After a 12-hr anneal at 1150.degree.C, purified Co could be cold-rolled to 80% thickness redn. without cracking, while unpurified Co only to 40-50%. X-ray diffraction and Vickers and Rockwell hardness measurements of Co, previously cold-rolled to 51% thickness redn., as a function of annealing temp. (100-800.degree.C) showed that purified Co recrystd. at 400.degree.C, and the u n-purified Co at 650.degree.C.

ST chlorides Co 2 purifn; cobalt 2 chlorides purifn; purifn Co 2 chlorides; deformability high purity Co; high purity Co prodn; crystn high purity Co; hardness annealing pure Co; annealing hardness pure Co

IT **7440-48-4P**, preparation
RL: **PREP (Preparation)**
(by electrolysis of purified **cobalt chloride**)

L50 ANSWER 36 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1969:483668 HCAPLUS
DN 71:83668
TI Adsorption of impurities by **ion exchangers** in neutral **nickel chloride** environment, purification of nickel(II) chloride, and preparation of high-purity nickel
AU Nardin, Mario; Wache, A. M.; Vu Quang Kinh
CS Centre Etudes Chim. Met., CNRS, Vitry, Fr.
SO Mem. Sci. Rev. Met. (1969), 66(4), 311-18
CODEN: MRMTAU
DT Journal
LA French
CC 54 (Extractive **Metallurgy**)
AB Carbonyl Ni was dissolved in 6N **HCl**. The acidic or neutral soln. was passed through static beds of anion-exchange resin Dowex 1 and cation-exchange resin Dowex 50W. After electrolysis with 10 amp./dm.2, Ni was detd. by radiotracer methods. A no. of impurity ions was better absorbed by the **ion exchangers** from neutral **NiCl2** soln. than from **HCl** soln. Analyses before and after purification in neutral medium are Co 7.9, not detectable; Fe 93, 2.3; **Cu** 37-60, 0.10; Mo -, 0.003; W -, 0.003 ppm. All other impurities are .ltoreq.0.1 ppm. The method is superior to zone melting, esp. for removing Co, Fe, and **Cu**. C is 40-1000 ppm. in the carbonyl Ni and was detd. to be 25-30 ppm. in the purified Ni.
ST nickel purifn; carbonyl Ni purifn; refining carbonyl Ni; **ion exchange** Ni chlorides; electrolysis Ni chlorides
IT Adsorption
(of impurities, from **nickel chloride** by **ion exchangers**)
IT **7440-02-0P**, preparation
RL: **PREP (Preparation)**
(**nickel chloride** purification for, by **ion exchange**)
IT **7718-54-9P**
RL: PUR (Purification or recovery); PREP (Preparation)
(purification of, by anion exchange)
IT 7439-89-6, uses and miscellaneous 7440-48-4, uses and miscellaneous **7440-50-8**, uses and miscellaneous
RL: REM (Removal or disposal); PROC (Process)
(removal of, from **nickel chloride** by **ion exchange**)

L50 ANSWER 37 OF 42 HCAPLUS COPYRIGHT 2002 ACS

WES0966861

AN 1969:59828 HCAPLUS
DN 70:59828
TI Recovery of nickel and cobalt from lateritic iron ore in a batch-fluidized bed
AU Heertjes, Pieter M.; Jessurun, R. M. M.
CS Tech. Univ. Delft, Delft, Neth.
SO Proc. Int. Symp. Fluid. (1967), 688-700. Editor(s): Drinkenburg, A. A. H.. Publisher: Neth. Univ. Press, Amsterdam, Neth.
CODEN: 20UBAZ
DT Conference
LA English
CC 54 (Extractive Metallurgy)
AB Lab. results are reported on a process for the selective conversion of hydrated oxides of Ni and Co in a lateritic Fe ore into their chlorides and subsequent **extn.** of these chlorides with H2O. The process is based on the difference in stability of NiCl2, **CoCl2**, and FeCl3 in the presence of gaseous H2O and **HCl**. By the proper choice of the ratio of H2O to **HCl** and the temp., a selective conversion of the oxides can be achieved in which NiO and CoO are converted into NiCl2 and **CoCl2**, resp., whereas Fe2O3 gives no H2O-sol. products. The process is carried out batch-wise in a fluidized bed, using granules of the laterite and a mixt. of steam and **HCl** as the fluidizing gas. The effects of the roasting temp. prior to chloridization, the time of reaction, the ratio **HCl**/H2O, the flow rate of the fluidizing gas, and the height of the bed on the selectivity of the conversion were examd. Preheating the laterite at **high temp.**, prior to chlorination, decreases the recovery of Ni. It is advisable to dry the wet granules at 100-110.degree. to remove the greater part of the water. The higher the percentage of **HCl** in the reaction gas, the higher the reaction rate. Care must be taken to prevent the granules from sticking together when high partial pressures of **HCl** are used. The optimum working conditions are with a **HCl**/H2O ratio of 45/55. Varying the gas flow rate does not show a marked influence on the final recovery. The best results are at a value twice the incipient fluidization flow. A bed height equal to the reactor diam. gives optimum results. The existence of at least 3 Ni and 2 Co compds. in the laterite was found. One Ni compd. does not react with **HCl**; a 2nd keeps its reactivity when heated a long time at 400.degree. prior to chlorination; while a 3rd is affected by heating prior to and during chlorination. The recovery of the 2nd Co compd. is not influenced by preroasting. The compd. appears to be deactivated in the presence of **HCl** and steam at 230.degree..
ST lateritic Fe ores; iron ores lateritic; nickel recovery Fe ores; cobalt recovery Fe ores; chlorination Ni Co
IT 7440-02-0P, preparation **7440-48-4P**, preparation
RL: **PREP (Preparation)**
(from lateritic iron ores by chlorination in fluidized bed)

L50 ANSWER 38 OF 42 HCAPLUS COPYRIGHT 2002 ACS
AN 1970:5340 HCAPLUS
DN 72:5340
TI Metallurgy of cobalt in a chloride medium
AU Tougarinoff, B.; Willekens, M.; Van Peteghem, A.
CS Met. Hoboken, Hoboken, Belg.
SO Ind. Chim. Belge (1967), 32(Spec. No.)(Pt. 2), 169-73
CODEN: ICBEAJ
DT Journal

WES0966861

LA French
CC 54 (Extractive **Metallurgy**)
AB Finely ground Ni-Co raw oxides, roasted mattes, or speiss were attacked in 2 stages by aq. **HCl**, first with 10 and then with 100 g/l., both for 2 hr at 95.degree.. The final soln. contained 10 g **HCl**/l. The metal concns. and the yields, resp., were: Co 44-80, 97.30-99.10; Ni 13-60, 96.60-98.60; Fe 21-50, 87.50-100; As 8-39, 72.60-98.10; and **Cu** 9 g/l., 84%. Precious metals and the last 1-10% of the Ni and Co may be recovered if these are subjected to an addnl. roast and subsequent treatment. Massive pieces of refractory metal scrap were attacked by **HCl** + Cl. **HCl** under O pressure is an attractive method of attack of complex materi als such as speiss and various residues, since it permits the elimination As, Fe, Cr, and Al as insol. arsenates. Pptd. precious metals may be recovered from the arsenate ppt. Refractory alloy scrap contg. Co 29, Ni 24, Fe 15, Cr 14, Mo 2.50, W 0.50, and **Cu** 0.50% was dissolved by anodic attack in 6N **HCl** for 25 hr until the acid was neutralized. The cell operated at 50.degree. and with a c.d. of 1500 A/m2. Metal concns. and yields, resp., were: Co 52, 99.70; Ni 38, 99.80; Fe 26, 99.30; Cr 19, 95; Mo 1.50, 95; W 0.10, 14; and **Cu** 0.40 g/l., 90%. Dry chlorination of these materials at 1100.degree. with 10% excess Cl produced 100% metal yields, and chlorination below 1000.degree. resulted in the same distr ibution of the metal chlorides, with the exception that NiCl2 and **CoCl2** were not volatilized.
ST cobalt recovery; nickel recovery; leaching Ni Co; iron recovery; chromium recovery; molybdenum recovery; tungsten recovery; **copper** recovery; scrap metals recovery
IT 7439-89-6P, preparation 7440-02-0P, preparation 7440-38-2P, preparation **7440-48-4P**, preparation **7440-50-8P**, preparation
RL: **PREP (Preparation)**
(from alloy scrap by leaching with **hydrochloric acid**
)

L50 ANSWER 39 OF 42 JAPIO COPYRIGHT 2002 JPO
AN 2001-020021 JAPIO
TI **MANUFACTURE** OF HIGH PURITY **COBALT**
IN NAGAO JUNKO; SEKINE SUSUMU; TANAKA MINORU; YOKOYAMA HIDECHIKA
PA KOJUNDO CHEM LAB CO LTD
PI JP 2001020021 A 20010123 Heisei
AI JP 1999-224389 (JP11224389 Heisei) 19990702
PRAI JP 1999-224389 19990702
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
IC ICM **C22B023-00**
ICS C01G051-08; C25C001-08
AB PROBLEM TO BE SOLVED: To efficiently **manufacture** a high purity **cobalt** minimal in metallic impurity content.
SOLUTION: Among metallic impurities, such as iron, zinc, tin, nickel, calcium, sodium, and magnesium, which are contained in an aqueous solution of **cobalt chloride** as a raw material, that which forms a chloride complex together with chloride ions is represented by the group A impurity and that which forms no chloride complex together with chloride ions is represented by the group B impurity. The impurities are efficiently removed by means of a first step where the group A impurity is removed by bringing the aqueous solution of **cobalt chloride** into contact with an anion-**exchange resin** and a second step where the group B impurity is removed by using an aminic organic solvent extraction agent. The resultant high

purity aqueous solution of **cobalt chloride** is
concentrated, dried and solidified, and then subjected to reduction in a
hydrogen air flow or to electrolytic reduction. By this method, the high
purity **cobalt** can be **manufactured**.

L50 ANSWER 40 OF 42 METADEX COPYRIGHT 2002 CSA
AN 1970(4):43-46 METADEX
TI PURIFICATION OF COBALT CHLORIDE BY SOLVENT EXTRACTION AND BY ION-EXCHANGE
CHROMATOGRAPHY. PRODUCTION AND PROPERTIES OF HIGH-PURITY COBALT.
AU DUBOIS, B ; ROCQUET, F ; NARDIN, M ; KINH, VU QUANG
SO MEM SCI REV MET, SEPT. 1969, 66, -9-, 683-690.
LA FRENCH
CC 43 REFINING AND PURIFICATION
CT COBALT: EXTRACTION; ELECTROREFINING; ION EXCHANGING; SOLVENT EXTRACTION

L50 ANSWER 41 OF 42 METADEX COPYRIGHT 2002 CSA
AN 1969(10):43-204 METADEX
TI APPLICATIONS OF ION EXCHANGE FOR THE PURIFICATION OF NICL2 AND THE
PREPARATION OF HIGH-PURITY NICKEL.
AU NARDIN, M ; WACHE, A M ; KINH, VU QUANG
SO MEM SCI REV MET, APR. 1969, 66, -4-, 331-320.
LA FRENCH
CC 43 REFINING AND PURIFICATION
CT NICKEL COMPOUNDS: REFINING; PURIFICATION; ION EXCHANGING

L50 ANSWER 42 OF 42 WPIX (C) 2002 THOMSON DERWENT
AN 1972-75307T [47] WPIX
TI High purity nickel prodn - from sulphurated nickel concentrates using
quaternary ammonium anion **exchange resins**.
DC M28
PA (NICL) LE NICKEL
CYC 9

PI	BE 783430	A		(197247)*
	NL 7206995	A		(197250)
	DE 2225240	A		(197251)
	ZA 7203430	A		(197310)
	FR 2138332	A		(197312)
	DE 2225240	B		(197338)
	GB 1370259	A	19741016	(197442)
	US 3840446	A	19741008	(197442)
	CA 970574	A	19750708	(197530)
	JP 48000224	A	19730105	(197943)
	JP 54029969	B	19790927	(197943)

PRAI FR 1971-18633 19710524; FR 1972-40112 19721113
IC C22B009-08; **C22B023-04**; C22D001-14
AB BE 783430 A UPAB: 19930831
Process for producing high purity nickel from sulphurated concentrates
comprising (a) drying and roasting the concentrates at about 900 degrees C
(b) dissolving in **hydrochloric acid** (c) oxidising the
iron contained in the soln. obtained (d) removing impurities in a strongly
basic quaternary ammonium anion **exchange resins** (e)
neutralising the slight excess of **hydrochloric acid**
(f) electrolysing the **purified nickel chloride**
soln. High purity **nickel** is produced at reduced cost. The
process uses very small amts. of purifying reagents. **Copper**,
cobalt iron and zinc can be additionally recuperated.
FS CPI